NavMed P-369

UNITED STATES NAVY

MEDICAL NEWS LETTER

Vol. 41 Friday, 21 June 1963 No. 12

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Policy

The U. S. Navy Medical News Letter is basically an official Medical Department publication inviting the attention of officers of the Medical Department of the Regular Navy and Naval Reserve to timely up-to-date items of official and professional interest relative to medicine, dentistry, and allied sciences. The amount of information used is only that necessary to inform adequately officers of the Medical Department of the existence and source of such information. The items used are neither intended to be, nor are they, susceptible to use by any officer as a substitute for any item or article in its original form. All readers of the News Letter are urged to obtain the original of those items of particular interest to the individual.

Change of Address

Please forward changes of address for the News Letter to: Commanding Officer, U. S. Naval Medical School, National Naval Medical Center, Bethesda 14, Md., giving full name, rank, corps, and old and new addresses.

The issuance of this publication approved by the Secretary of the Navy on 28 June 1961.

Sorting: A Possible Solution to the Management of Mass Casualties

From: Symposium on Management of Mass Casualties, USNH San Diego, Calif. Compiled and submitted by CAPT V. C. Stratton MC USN (Ret), formerly Chief of Surgery of the Hospital.

The introduction of large numbers of nuclear and thermonuclear weapons into the arsenals of possible belligerents demands that everyone concerned with medicine take a long reflective look into the problem of handling large numbers of surviving casualties produced simultaneously over a wide area. In this current age of cold war, semiwarm war, and "brinkism" to hot war, the potential for disaster dictates that concern over methods and philosophies to handle casualties produced en masse be more than superficial or transitory. An enemy reaching a decision to strike with weapons of such enormous destructive power can certainly be expected to direct that strike against multiple targets simultaneously with certain targets receiving multiple weapons. Anything less would increase the retaliatory threat to his own homeland. The number of casualties, both dead and living, producible by an all-out nuclear weapon assault on the United States is difficult to estimate in our present state of civil preparedness. Current mock-attack estimates mention numbers reaching eighty millions, half of whom might survive initially and require medical care to assure continued survival.

A method of handling mass casualties must be developed, understood, and accepted by the medical and allied professions if any hope is to be held toward making the problem manageable. Medical sorting of casualties into classes of injury and treatment priority is one possible approach to assure that, with the capabilities at hand, the greatest good will be done for the greatest number. Concern must be for the survival of the nation rather than the comfort of the individual. In the past, during wars and civil disasters almost all casualties have received medical care on the general basis that the most seriously wounded or injured received highest priority for treatment while those will lesser, nonurgent injuries waited their turn. The availability of supplies, qualified treatment personnel, facilities, and time permitted this approach. Exceptions in specific circumstances, especially on the battlefield, have been made, but this has been the customary or historic approach to management of the injured. In a nuclear war in which supplies in large quantity may be destroyed or remain out of reach to the devastated areas, qualified personnel in large numbers will be counted among the casualties, facilities will be destroyed in target areas, and casualties in enormous numbers will be produced in a fraction of time. Application of customary or historic methods will serve only to magnify the disaster.

Sorting, or triage, is defined as the procedure by means of which the sick and wounded are classified as to the type and urgency of the condition presented so that they may be properly routed to the installation best suited for their care. This philosophy has always been the basis of casualty management

in the Medical Service, from the corpsman level throughout the system of evacuation and treatment to the most complex or specialized military medical installation.

During World War II and the Korean War the seriously wounded were sorted at the first level medical installation, the battalion (now battle group) aid station. They were given highest priority for treatment or evacuation to division level (clearing company) facilities, auxiliary surgical units (WW II), mobile army surgical hospitals (Korea), and medical company. Such early sorting and forward expert treatment accounted for remarkable decreases in mortality rates over those of previous wars among those living to reach medical care. It must be emphasized, however, that these accomplishments were possible only because of the presence of adequate medical facilities, supplies, personnel, and transportation serving wounded generated over measurable periods of time. These circumstances cannot be classified as mass casualty situations by the criteria that must be used today.

If the greatest good for the greatest number is to be achieved under the impact of thermonuclear warfare, then the concept of sorting must be changed to meet the magnitude of the problem. A newer definition might be: Sorting, or triage, is the procedure by means of which the sick and wounded are classified as to the type and urgency of the condition presented, and then routed, under these priorities, to any installation available for care. The aim of sorting, under these conditions, must be to return the greatest number of individuals to duty or to work within the means provided by available personnel, supplies, and equipment.

Another aspect of sorting can best be explored using an example involving a mock-attack situation in which "City-X" with a population of 40,000 has received a direct hit by a nominal (20 kiloton TNT equivalent) weapon. This problem, worked and reworked many times at the Army Medical Service School provides 14,583 surviving casualties requiring some degree of medical treatment. This casualty figure is based on unclassified parameters for heat, blast, and radiation, and on a devised population density (uniform distribution).

In Korea, experience showed that one sorting team consisting of a trained mature surgeon and one assistant could classify approximately 50 patients per hour. In practice, the physician merely examines the patient, classifies him, and specifies any immediate treatment needed while the assistant makes the necessary notes to accompany the patient. If 50 patients are or can be sorted in one hour, then 14,583 divided by 50 equals 291 hours, or approximately 12 days required to accomplish the task by one team. In "City-X" it might be possible to form 8 sorting teams, thereby accomplishing the sorting—and only the sorting—in $(12 \div 8)$ approximately 1.5 days. This does not include any time for treatment of these patients. Naturally, during the period they are in the sorting station, some of the casualties with minimal injuries under the classification to be discussed later will receive the only treatment needed and will be removed from the treatment-evacuation system. Such treatment will be administered by paramedical personnel (dentists, veterinarians, nurses, and others) who are expected to be utilized in a sorting area.

Now, the problem of increased morbidity and mortality due to delayed care arises. To treat all the patients requiring immediate, lifesaving surgery within the first 24 hours, which is the ideal goal since mortality and morbidity are lowest under these circumstances, the following personnel would be needed to handle the 6450 casualties requiring this type of care:

$$6450 \div 10.5 = 614 \text{ surgeons, and}$$
$$614 \text{ anesthesiologists or anesthetists}$$

The figure 10.5 was derived from a time study which was made during the Korean War. It was found that a surgical team which had worked together for some time was able to handle only 10.5 cases per 24 hours. Obviously, this is compounded; one cannot keep working 24 hours continuously without making errors of technic and judgment, and jeopardizing the lives of patients. But for the purpose of the problem, let us assume the operating teams can continue at this rate. If this were so, the figures above are correct. Undoubtedly, in a town of 40,000 population there would not be 614 surgeons and 614 anesthesia personnel. A population survey indicates that in such a town there might be approximately 125 physicians. Thus, by allotting 100 of these as surgeons and 25 as anesthesiologists, it could be concluded that it would take $614 \div 100$, or 6.14 days of uninterrupted work, to perform the immediate lifesaving surgery needed. Adding the 1.5 days required to sort the patients results in a total of 7 plus days needed to take care of all patients. Considering the anesthesia personnel required, it is obvious that there are only 25 physicians for this type of care. Where will the additional personnel come from? Dentists, nurses, and veterinarians are usually trained in simple anesthesia technics. In the military this phase of training had not been put into the paramedical program until recent times. Many felt that this was necessary to a full utilization of potential, and it was anticipated that important developments would occur in this direction. *

From the foregoing information it is apparent there will be a "price-to pay" for the necessary delay in treatment; namely, a fairly marked increase in morbidity and mortality rates. This is due to DISPARITY. What is this disparity? It is the difference between the available medical personnel, supplies, and equipment and the huge number of casualties that will have been caused by thermonuclear warfare. This predicted disparity has forced a change in philosophy with respect to establishing priorities for treatment that will be used in such a situation. This will be discussed later in this article.

The price in lives that may have to be paid in the situation outlined above can be estimated by using statistics available from the battlefield. The mortality among battle casualties reaching medical facilities in Korea was 2.4%. Here was a situation considered by many as ideal from the standpoint of adequate facilities, personnel, and supplies, with short lines of evacuation and specialized professional aid in the division zone. If this figure—2.4% mortality—is used to determine the number of deaths among initially surviving casualties, 349 deaths can be predicted. In the Crimean War, in which the

surgery available to battle wounded did not include open abdominal, thoracic and cranial procedures, but was limited to simple amputations, wound dressings, and similar maneuvers, the mortality rate was 17% to 22% depending on the source of information used. Applying the better figure, 17%, to the 14,583 living casualties from "City-X", 2479 deaths would occur. These deaths for the most part can be assumed to occur as a result of delay in treatment or non-availability of specialized abilities.

The difference is 2479 - 349, or 2130, and represents the cost in lives of delay and compromise in treatment that may be necessary under disaster situations of such magnitude.

As discussed by others in this symposium, there are three main effects of a thermonuclear explosion. The types and distribution of casualties which might be expected to confront the medical resources are:

Burns.....	33.3%
Trauma (injury).....	33.3%
Burns plus trauma..	33.3%

Is anything missing? Most certainly—radiation has not been mentioned. Is there a reason for this? Actually, there are several reasons. In the first place, present personal dosimeters are not accurate enough from the standpoint of response to the penetrating radiations to measure exposure dose or absorbed dose to a degree of certainty permitting clinical decisions to be made. In addition, the exact position of the individual at the time of the explosion may not be known. He may have been partially shielded by a building or a foxhole; thus, the dose as reflected on the dosimeter might not represent total body radiation. The total body dose is the important facet of radiation. Therefore, for the problem of sorting at our present inadequate state of knowledge concerning dose, radiation must be ignored, and the individual must be treated as though he had received none. The radiation injury will be treated when symptoms are present. It is expected that two-thirds of the casualties will receive burns, and this threatens to be a major portion of any casualty load caused by nuclear explosions.

* Editor's Note. The Dental Corps of the U. S. Navy is now engaged in a very active program of obtaining organized in-Service training of dental officers in general anesthesiology. Board certified and/or qualified medical officers of the various Anesthesiology Services of our U. S. Naval Hospitals conduct both didactic and practical on-the-job instruction for a period of 4 weeks for each class. All basic science fundamentals and the full gamut of the specialty, including practical aspects which dental officers might be called upon to perform, are included in these full-time courses. The training is given mainly to younger dental officers prior to their reporting for sea duty or service with the Marine Corps. The concept back of this program is the importance of qualifying dental officers to give general or other anesthesia as integral members of surgical teams in combat or any situation involving mass casualties wherein their services are vitally essential in that capacity.

It is significant that many young medical officers are also being given this specially tailored in-service on-the-job training by our qualified or certified anesthesiologists. This will enable them to be of even greater assistance in augmenting surgical teams on large ships such as aircraft carriers, with Marine forces, or in times of great emergency.

The Nurse Corps of the U. S. Navy has also established an intensified formal program of anesthesia training at the U. S. Naval Medical School, National Naval Medical Center, Bethesda, Md., in affiliation with George Washington University, Washington, D C. The first year of the two-year program consists of didactic instruction in anesthesia—especially the basic sciences relating to that field. The second year is spent in selected U. S. Naval Hospitals for clinical experience under qualified supervision. These Nurse Corps officers are then eligible for consideration for ultimate Certification as Qualified Nurse Anesthetists.

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Radioisotopes in Tropical Medicine (Concluded)

WHO Chronicle, Vol. 17, No. 3, March 1963

Tracer Techniques and Insect Biochemistry (15)

The use of radioactively labeled insecticides enables their metabolic fate in insects to be followed with great sensitivity and specificity; this has thrown much light on the mechanism of insect resistance. Labeled insecticides may be prepared by direct synthesis from radioactive elements made in the atomic pile or particle accelerator. Thus, ^{14}C-DDT or its ^{82}Br-analogue may be used, or a double label may be applied to a single insecticide molecule, as in ^{32}P-^{35}S-parathion so that the fates of different portions of the same molecule may be followed simultaneously.

To label insecticides of botanical origin, biosynthetic technics may be used. Thus, radioactive pyrethrins may be obtained from pyrethrum plants by growing the plants in an atmosphere containing $^{14}CO_2$.

Alternatively, the metabolism of normal or poisoned insects may be studied after feeding or injecting the insects with suitably labeled substrates and comparing the various labeled pools of chemically related metabolites so obtained. This labeling of metabolite pools in vivo is easily achieved in the case of houseflies by rearing them on substrates containing ^{32}P-phosphates or ^{14}C-acetates and throws considerable light on a number of important cycles

Since 1945, the refinement of microfractionation technics using chromatography and electrophoresis has run parallel with the development of radioactive tracer methods. Application of the combined technics has proved

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15. Winteringham, F. P. W. (1962) In: Radioisotopes in tropical medicine, p. 283.

to be particularly effective in the study of insect biochemistry. Almost invariably, mixtures of labeled insecticide and its metabolites or labeled metabolites obtained by the pool technic mentioned above can be resolved by paper, column, or gas-liquid chromatography. Automatic radiometric scanning of the resulting paper chromatograms or column effluent thus permits a complete radiochemical analysis. An accompanying illustration of the use of the combined technics demonstrates a higher rate of DDT-detoxication in the resistant housefly. In a similar way it is possible to study the action of insecticides on particular biochemical systems, e.g., the interference of dieldrin with carbohydrate metabolism at the a-glycerophosphate level, or the effects of drugs on acetylcholine metabolism.

Parasitological Problems in Tropical Medicine

Parasitological problems in tropical medicine, though many and varied, are chiefly in the fields of protozoology and helminthology. They include problems relating to the metabolism and life cycles of parasites, to the changes—including immunity reactions—that parasites excite in the metabolism of their vertebrate hosts, and to the zoonoses in vertebrate hosts transmissible to man. Many details are still obscure (16). It is not known, for instance, why only a few species of Anopheles mosquito are suitable hosts for the plasmodium of malaria, exactly how the sporozoites reach the vertebrate liver, or what is the nature of the protection afforded by hereditary sickling of red cells or the deficiency of glucose-6-phosphate dehydrogenase.

All these questions are susceptible of isotopic analysis. Thus, the role of hemolysis varies greatly in different types of malaria infection and can be studied in man and animals at different stages of infection by the injection of red cells tagged with ^{59}Fe. Alternatively, healthy subjects may be injected with red cells carrying both a radioactive tag and malaria infection (17). In amoebiasis, the differentiation of harmless from pathogenic Entamoebae and the question whether monkey amoebiasis can spread to man are also open to isotopic investigation. The modes of transmission to man of Toxoplasma and Sarcocystis are still unknown, and might be elucidated by the use of radioactive tracers. In the various helminthiases (18) there are still obscure stages, even in the hookworm cycle, and more information is needed about the role of intermediate animal reservoirs and parasite-host metabolism if effective control is to be instituted. Radioisotopes have helped to provide such information, and the use of isotopes in experimental chemotherapy is only just beginning. An early application of radioisotopes to helminthology was the use of ^{32}P to show that encysted larvae of Trichinella spiralis exchange ions with their host in active metabolism through the cyst wall. Helminth larvae may be studied

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16. Garnham, P. C. C. (1962) In: Radioisotopes in tropical medicine, p. 305.
17. Leithead, C. S. (1962) In: Radioisotopes in tropical medicine, p. 317.
18. Dissanaike, A. S. (1962) In: Radioisotopes in tropical medicine, p. 323.

by allowing them to develop within the tissues of a previously radioactivated vector before transmission to a vertebrate host; by labeling the food or substrate of their free-living phase; of by immersing encysted larvae in suitable isotope solutions. Thus, filarial larvae can be labeled by radioactivation of their mosquito vectors, using mosquitoes whose larvae have been laboratory reared in media containing ^{32}P-orthophosphate, the adult mosquitoes so raised then being fed on patients with filariasis. It is possible, using this method, to obtain individual infective larvae of Artionema digitata (a filarial worm of cattle) with beta-radiation counts as high as 174 per minute, a level high enough to permit detection by counters or by autoradiography. It does not follow that the fate of these parasites is easy to pursue within their vertebrate host, for beta rays are readily absorbed in the tissues. It may be necessary to use probe counters, or to sacrifice an experimental host, or to use isotopes emitting both beta and gamma rays and with a relatively long half-life. Even then, localization may not be accurate.

At this point, it may be added that autoradiography affords a powerful tool in all forms of parasite research. Many of the results of simple tracer experiments are difficult to interpret. But with autoradiography all that is needed is to feed the organism with raw materials labeled with radioactive atoms over a given period, and then treat it to remove all the soluble radioactive precursor so that only the final fixed product in the tissues is left for measurement. The Geiger counter is often too insensitive if radiation dosage has to be kept sufficiently low to prevent tissue damage, and there are great advantages attaching to the use of very thin photographic films for the autoradiography of specimens. This technic may even be used on a quantitative basis and is also applicable to the study of intermediate hosts such as fresh water snails in bilharziasis. Autoradiography can be used in the study of trematode flukes and may make it possible to investigate problems of fluke migration within man and other hosts, e.g., the movement of Fasciola hepatica from bowel to bile ducts, by tagging their metacercariae in experimental animals. Similar problems in other fields include the arrival of filariae in the lungs and of other parasites in the central nervous system, and the migration of Dracunculus from the intestine to its final site in the subcutaneous tissues.

The radioisotopic study of the physiology and biochemistry of parasitosis (19) may be centered mainly on the parasite as such, or on the host parasite system as a unity. The use of tracers is easier in the former case, but is most valuable in the latter because other methods are more likely to disturb the normal balance of host and parasite. By this means the differences between the metabolism of parasites and their vertebrate hosts can be indicated, and hence the vulnerable points in parasite physiology that may be attacked with least risk to the host. These may lie in cellular or intermediary metabolic processes, e.g., in glycolysis or in the cytochrome system. In vitro studies may employ entire parasites or tissue preparations. ^{14}C is often used, e.g.,

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19. Rogers, W.P. (1962) In: Radioisotopes in tropical medicine, p 341.

in studying the details of the pyruvate cycle. Some syntheses occur only in parasites and not within their vertebrate hosts, e.g., the production of chitin in the shells of nematode eggs. No suitable radioactive isotopes of nitrogen are available, but isotopes of hydrogen and sulfur are of special value. Thus, the use of ^{35}S-labeled thiamine has shown that Hymenolepis diminuta obtains the material directly from the bowel mucosa of its rat host. The labeling of simpler compounds such as urea, glucose and amino acids demonstrates that some enter the parasite from the host by simple diffusion, others by active catalytic processes; this provides information not only on the details of the host-parasite relationship but also on the best methods of enabling noxious compounds to reach the parasite.

It is also possible to use labeled materials to elucidate the mechanism of resistance and susceptibility in parasitic infection. In many nematodoses, successful infection depends on the host supplying a local concentration of dissolved carbonic acid suitable for the particular species of parasite. Labeled compounds are also useful in studying the mode of action of drugs on parasites. Thus, when radioactive phenothiazine labeled with ^{35}S is given to the host, it can be shown that its distribution between host and parasite is such as to indicate that the phenothiazine itself, rather than any derivative, is the active anthelmintic. Similarly, the molecule of stilbamidine used against bilharziasis may be tagged at two different points so that its degradation pathways may be followed more clearly in host and parasite. When radioactive tartar emetic has been given to dogs suffering from filariasis, the drug is found in highest concentration after 36 hours in the liver, then in the thyroid and parathyroids, and next in the actual parasites. Such methods make it possible to follow an administered compound throughout its pathways in the host tissues, to determine how rapidly it enters the circulation, where it is broken down, where it accumulates, and how rapidly it is excreted. Similar considerations apply to the parasite itself. Antimalarials such as proguanil may be labeled to elucidate their distribution in the host and at the same time to study their effect on the synthesis of nucleic acids in the plasmodia. It has been shown in this way that the action, or partial action, of antimalarial compounds is to inhibit the incorporation of phosphorus into either the DNA or RNA system of the nucleus, or both. It is also possible to follow the action of surface-active agents. It is of course, desirable that the small doses of radiation used in these methods should not unduly damage or otherwise interfere with the malaria plasmodia or other protozoa under study. Fortunately, from this point of view, protozoa are extremely resistant to radiation, even to doses of many thousand roentgens.

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NOTE: As the result of a recent query from the medical officer of a U.S. Naval field activity, the Bureau's reply is reproduced on the following pages. It should be of general interest to all Medical Department activities since it may serve as policy guidance in this sometimes difficult area of physician responsibility. Close adherence to the principles involved will protect the interests of the Government and the individual alike. —Editor

Medicolegal Aspects of Sobriety Examinations

"1. Reference (a) requested guidance in conducting sobriety examinations, specifically:

a. Is there a legal or moral responsibility of the medical officer to conduct a sobriety examination on his own without a request from higher authority when there is no medical indication to perform such test?

b. What action should be taken by a medical officer when a patient refuses to submit to a Bogen's test?

c. What directive replaces Chapter 19?

2. Since a revision of Chapter 19 of the Manual of the Medical Department has not been published, the only directives pertinent to the questions posed are Chapter 18 of the Manual of the Medical Department, and the Manual of the Judge Advocate General.

3. Aside from the fact that, as a naval medical officer, the physician has a primary duty to treat the sick and injured, he also has an obligation as a naval officer to perform whatever duty is necessary to comply with existing directives of any echelon of command. Paragraphs 0801 and 0802 of the Manual of the Judge Advocate General require that an LOD investigation be conducted under the following circumstances:

> "In every case of injury to a member of the naval service (other than by enemy action) resulting in physical inability to perform his duties for a period in excess of twenty-four hours, or where payment of disability benefits may be claimed, the injury will be investigated and reported by a fact-finding body. An investigation will be conducted and a report will be submitted in every case in which the circumstances indicate that an individual intentionally injured or disabled himself; however, a determination as to line of duty and misconduct as subsequently described in this chapter is required only in those cases where the intentionally self-incurred disability results in inability to perform duty for a period in excess of twenty-four hours (as distinguished from the period of hospitalization for evaluation or observation) or where payment of disability benefits may be claimed. . . ."
>
> "In any case of disease of a member of the naval service which results in loss of time from duty in excess of twenty-four hours and which is attributable to vicious habits, intemperance, or other factors suggesting misconduct, a fact-finding body will be ordered and a report submitted."

(See also requirements for completion of NAVJAG 486, Chapter VII of JAG Manual.)

In this connection, a sobriety examination, although not a sole basis for determinations in all cases, is in some cases given considerable weight toward the protection of the individual or the Government. It must be borne in mind, however, that a sobriety examination does not necessarily include a Bogen's test, or other body fluid testing, and such tests need not be performed in order for the determinations to be conclusive. Moreover, there are occasions when a determination as to fitness or unfitness for duty is involved. Since a person's inability to perform his duties may adversely affect other personnel or affect the mission of the command, medical judgment is demanded concerning this aspect. Thus, since sobriety frequently is the basis for legal or administrative determinations and since the examining medical officer is in an advantageous position to assist with such determinations, it is patent that the medical officer does have a legal and moral obligation to conduct a complete examination including a sobriety examination, with a request of line authority when, in his judgment, the information may be relevant to the interest of the individual or the Government or both, even though such an examination may not be required in the treatment of the individual.

4. In regard to the second question, there must first be consideration as to the need for such testing for medical reasons. If it is determined that a medical need exists, the individual need not be warned of his rights against compulsory submission. If he does not consent to such testing, consideration must be given to whether the refusal is reportable by board of medical survey action in accordance with the regulations prescribed in Chapter 18 of the Manual of the Medical Department, paragraph 10 (2) (b) (2). The admissibility of such test results, obtained for medical purposes, in court-martial proceedings or administrative determinations when consent has been given without warning to the individual of his rights under the Uniform Code of Military Justice, is a matter for legal authorities. In the absence of consent from a conscious patient, withdrawal of body fluids should not be forcibly obtained. In those cases where the patient is physically and mentally incapable of giving consent, the specimen may be drawn if the absolute medical need exists before adequate treatment can be rendered.

5. In the absence of a medical need for the testing of specimens, both warning under Article 31 of the Uniform Code of Military Justice and consent are necessary before withdrawal.

6. Notwithstanding the foregoing, the medical officer should exercise great care in recording the objective actions and appearance of the individual concerned. These findings alone are frequently sufficient upon which to base legal decisions."

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Changes in the Blood Coagulation Complex in Sedentary Middle-Aged Males During Two Weeks of Strenuous Exercise *

John J. Burt, Arthur A. Spector, Lee D. Cady Jr, Menard M. Gertler, and George L. Calvy. **

The effects of strenuous exercise on related phenomena of blood coagulation and fibrinolysis were studied in middle-aged men (30 to 45 years) assigned to sedentary jobs. Two weeks of training (two hours daily) resulted in a significant increase in physical fitness as measured by the Harvard Treadmill Test.

At the end of the first two days of training a significant acceleration in whole blood clotting time (50%) was observed. However, no changes were found in plasma clotting time, prothrombin time, or fibrinolytic activity. Whole blood clotting time returned to normal after the 48-hour post exercise determination. The exercise period had no significant effect on serum cholesterol, triglyceride, or lipid phosphorus concentrations.

The finding of an accelerated whole blood clotting time in the immediate post exercise period is consistent with the suggestion that unaccustomed strenuous exercise by a sedentary individual may be a precipitating factor in acute cardiovascular catastrophes.

* Summary of a paper presented at the Annual Meeting of the American College of Sports Medicine, Minneapolis, Minn., 2 May 1963.

** Naval Medical Field Research Laboratory, Camp Lejeune, N. C., and Institute of Physical Medicine and Rehabilitation, New York University, New York, N. Y.

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The Importance of Knowing

It is estimated that three and one-half million Americans suffer from diabetes. Many people, particularly those in the upper age brackets, have some form of cardiovascular disease. The wearing of contact lenses has become increasingly popular with those who need corrective vision. The successful treatment of unexpected and sudden illness or accident can be greatly impaired where the attending physician is unaware that the patient is diabetic, has heart trouble, or wears contact lenses. Concerned with this problem, the American medical profession for years has urged each individual to carry a medical identification tag.

A medical tag should contain personal identification data, such as the name, address, next of kin, and person to be notified in an emergency. Of equal, if not more, importance is the inclusion of such medical information as the individual's blood type, medicine to which he is allergic, essential medication which he is required to take, whether he wears contact lenses, and other necessary medical information. The availability of this information in the case of accident or illness away from home may mean the difference between life and death to the individual.

Naval activities should encourage employees to consider the advantage of obtaining such medical identification tags. There are several excellent commercial sources from which medical tags of identification cards may be obtained. The local medical society can, in many cases, recommend approved sources. Individuals should be encouraged to discuss this matter with their family physician to evaluate the necessity of such a tag and to insure that any information contained on the tag is useful, accurate, and current.

From: OIR Newsletter, Office of Industrial Relations, Navy Department. XIV (5), May 1963.

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MISCELLANY

The Navy - UC - NIH Emphysema Project - A Progress Report

Submitted by Rear Admiral T. G. Hays MC USN, Commanding Officer, U. S. Naval Hospital, Oakland, Calif., and DMO, 12th Naval District.

A documentary color and sound motion picture produced by CAPT Charles K. Holloway in connection with the Navy-UC-NIH Emphysema Project in which he is participating at the University of California campus at Davis has earned honors for the Navy.

The movie was shown to more than 500 physicians of the International College of Chest Physicians at New Delhi, India, in February, by Dr. Gerald L. Crenshaw, one of Oak Knoll's thoracic surgery consultants. The film was favorably received and a copy of it was presented to the Indian Government for its research film library. A revised version of the film presented at the American College of Chest Physicians Film Judging in Chicago on 30 April received an Honorable Mention Award in competition with a number of professionally produced films. It will be shown on 15 and 16 June at the American College of Chest Physicians Meeting in Atlantic City where CAPT R. O. Canada, Commanding Officer of USNH Bethesda, and former Oak Knoll Chief of Medicine, and CAPT Joseph L. Whatley of the surgical staff will receive the award for the Navy.

The study of the pathologic physiology in equine emphysema will soon be going into its fifth year. Fifty-three thoracotomies have been performed on horses as part of the investigation which is a joint effort of the Research Service of USNH Oakland, the U. S. School of Veterinary Medicine, Office of Naval Research, and the National Institutes of Health.

Dr. Holloway's picture shows details of a portion of the research procedures and photomicrographs of tissue under study. CAPT Canada, CAPT Donald Edwards, and CDR E. E. Parker had roles of major importance in getting the project started. Three civilian consultants—Dr's Crenshaw, Harold A. Harper, and George H. Reifenstein—have been vitally interested in the project since it began, as has Dr. Richard McLaughlin, former staff doctor now practicing in Burlingame.

In the year and a half that Dr. Holloway has headed the local Navy section of the project, CAPT Whatley, CDR Raymond L. Watten, and LCDR D. L. Larson have been active participants. Also aiding in the study are HM2 Leslie Easley, HM3 Mike Moran, and HN's Mike Keckler and Bob Adams.

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American College of Physicians Meets Again in the Far East

The Third Far East Session of the American College of Physicians was held on 9, 10, and 11 May 1963 at the U. S. Army Medical Command Hospital in Zama, Japan. One hundred fifty-four American military and civilian physicians and 111 Japanese doctors attended the meeting. American military officers from many locales in the United States of America, Korea, Okinawa, the Philippines, and Guam, as well as from Japan, attended. The Japanese were represented by eminent deans and professors who gave presentations or served as panel members.

Howard P. Lewis MD F. A. C. P., Professor and Chairman of the Department of Medicine, University of Oregon School of Medicine, and Regent of the American College of Physicians, served as the official representative of the College as well as the American Medical Association. A. O. Severance MD, Professor in Pathology, Baylor University Medical School and Consultant in Pathology to the Surgeon General of the U. S. Army, and Colonel Frederic J. Hughes MC USA represented the Army. Lieutenant Commander Charles E. Brodine MC USN from the U. S. Naval Medical Research Institute, NNMC, represented the Surgeon General of the U. S. Navy. The General Chairman for the meeting was Captain G. M. Davis MC USN F. A. C. P., Commanding Officer, U. S. Naval Hospital, Yokosuka, Japan, and Force Medical Officer, U. S. Naval Forces, Japan. The Program Chairman was Captain R. E. Faucett MC USN, Associate ACP, Chief of Medicine, U. S. Naval Hospital, Yokosuka.

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Preventive Medicine Manual. Chapter 6, Water Supply Afloat, (NAVMED P-5010-6) has been distributed. Copies may be obtained from East or West Coast Supply Depots. This long awaited chapter should prove to be of great value to the fleet.

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SUGGESTED PLAN OF IMMUNOLOGIC TREATMENT FOR PATIENTS WITH TETANUS-PRONE WOUNDS[1]

(Prepared by Norman A. Christensen,[2] M.D., Section of Medicine)*

Type of wound (judged after local treatment)*	Patient unimmunized	Patient partially immunized with tetanus toxoid				Patient completely immunized with tetanus toxoid				
	No previous toxoid	One previous injection of pptd. or 1 or 2 of plain toxoid within:		Two previous injections of pptd. or 3 of plain toxoid. Last injection:		Three previous injections of pptd. or four of plain toxoid (basic immunologic series†, or subsequent interval‡, or wound booster§ within:				
		1 Mo. of injury	1-12 Mo. prior to injury	Within 3 mo. of injury	3 Mo. or more prior to injury	0-6 Mo.	6-12 Mo.	1-5 Yr.	5-20 Yr.	20+ Yr.
I. Clean	(1) Give first injection of toxoid. Arrange to complete basic immunization†	(1) None	(1) Second injection of pptd. or 2nd or 3rd of plain toxoid and complete basic series	(1) None	(1) Third injection of pptd. or 4th of plain toxoid to complete basic series	(1) None	(1) None	(1) None	(1) Interval toxoid booster (2) Can give 2nd injection of toxoid in 4-6 wk. if 10+ yr., then interval booster q. 5 yr.	(1) Two injections of toxoid at 4-6 wk. intervals, then once q. 5 yr.
II. Contaminated, potentially infected	(1) After skin test‖ give 3000 U. TAT IM (2) Start basic series of toxoid in opposite arm and arrange to complete	(1) 3000 U. TAT IM	(1) 3000 U. TAT IM (2) Second injection of pptd. or 2nd or 3rd of plain toxoid in opposite arm and complete basic series	(1) 3000 U. TAT IM	(1) Same as above	(1) None	(1) None	(1) Wound booster, then interval booster‡ of toxoid q. 5 yr.	(1) Wound booster (2) Same as 2 above	(1) Same as above (2) Can give 3000 U. TAT IM in opposite arm if treatment delayed and type of wound warrants
III. Infected	(1) 3000-30,000 U. TAT IM¶ (2) First injection of toxoid in opposite arm if 3000 U. TAT; if more, best wait 4 wk. and arrange for basic series	(1) 3000-30,000 U. TAT IM	(1) 3000-30,000 U. TAT IM (2) Second injection of pptd. or 2nd or 3rd of plain toxoid in opposite arm if 3000 U. TAT; wait 4 wk. if more, and complete basic series	(1) 3000-30,000 U. TAT IM	(1) Same as above	(1) None	(1) Can give wound booster§ of toxoid	(1) Same as above	(1) Wound booster (2) Same as 2 above (3) Can give 3000 U. TAT IM in opposite arm espec. if more than 10 yr. and if wound seriously infected	(1) Same as (1) above, plus: (2) 3000 U. TAT IM in opposite arm

Definitions:

**Local treatment* — thorough cleansing and débridement of wound. If it remains potentially or definitely infected, give antibiotic therapy and delay closure until infection is under control.

†*Basic immunization with tetanus toxoid* — series of two 0.5-cc. injections of precipitated (pptd.) toxoid or three 0.5-cc. injections of plain toxoid deep subcutaneously or intramscularly (IM) at 4-6 wk. intervals, with a 3rd of pptd. or a 4th of plain toxoid in another 6-12 mo. *Pptd. toxoid preparations* = alum pptd., aluminum hydroxide adsorbed, and aluminum phosphate adsorbed. *Plain* = fluid toxoid.

‡*Interval booster of tetanus toxoid* — 0.5 cc of pptd. or of plain toxoid is recommended every 5 yr after completion of basic immunization or subsequent booster.

§*Wound booster of tetanus toxoid* — 0.5 cc. of pptd. or of plain toxoid given when indicated at time of wound if considered tetanus-prone after local treatment and if patient has been previously immunized with toxoid.

‖*Skin test with equine (or bovine)-serum tetanus antitoxin (TAT)* — follow prescribed recommendations enclosed in each package; this procedure should *always* precede use of these sera. When the test is positive and indication warrants, give human-serum antitoxin if available, or desensitize patient with available animal-serum antitoxin in prescribed manner (Proc. Staff Meet., Mayo Clin. 32:160-166, April 3, 1957).

¶3000-30,000 U. TAT IM — amount dependent on nature and character of wound. Dose is amount considered necessary to protect the patient against tetanus during period of wound healing; e.g., minor infected wounds 3000-5000 U., major infected wounds 10,000-30,000 U.

1. *This plan is presented as an aid to the physician in the emergency treatment of wounds, but it is recognized that the ultimate solution of the problem of tetanus is universal immunization with tetanus toxoid.*

2. *Assisted by members of the Mayo Clinic Tetanus Team.*

* From: Proceedings of the Staff Meetings of the Mayo Clinic. 38 (8): 146-147, April 1963

NMRI Exhibit Wins Award

A scientific exhibit entitled "Prevention of Heat Casualties" won the Award of Merit at the American Industrial Health Conference held 18 - 21 March 1963 at Washington, D. C. The award was presented to CAPT David Minard MC USN by H. Glenn Gardiner MD, President of the Industrial Medical Association.

This exhibit demonstrates the program introduced by the Bureau of Medicine and Surgery of the Navy to prevent heat illness among personnel at training installations of the Marine Corps. The program was devised largely as a result of studies by CAPT Minard, Head of Stress Physiology Division, Naval Medical Research Institute, NNMC, Bethesda, Md., and Head, Thermal Stress Branch, Occupational Medicine Division, Bureau of Medicine and Surgery, in collaboration with the late Professor C. P. Yaglou of the Harvard School of Public Health, and Professor H. S. Belding of the University of Pittsburgh.

The focal point of the exhibit is a compact electronic climate chamber in which the hot dry climate of the desert, the warm humid climate of the jungle, or comfortable conditions of a temperate climate actually can be produced by pressing a button. As conditions within the chamber change, the background scene within the chamber changes to one appropriate to the climate selected. The effects of the presence or absence of sun and/or wind can also be demonstrated. A weather monitoring station similar to those actually in use at Marine Corps training stations is located inside the chamber.

The exhibit dramatically points out the inadequacy of indices used prior to the "Wet-Bulb Globe Temperature (WBGT) Index", and also emphasizes the important concept of curtailing physical exercise sooner for men in the first weeks of training, i.e., the least acclimatized group, with a gradual increase in heat stress as measured by the WBGT Index permitted for more seasoned trainees.

After the introduction of this program at the Marine Corps Recruit Depot, Parris Island, S. C., the incidence rate of heat casualties was reduced to approximately one-tenth of the previous level with an actual decrease in training hours lost because of hot weather. The exhibit also details other key elements in the Navy Department's preventive program against heat illness.

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USNRDL Psychologist Awarded Achievement Medal

Edward L. Hunt, psychologist at the U. S. Naval Radiological Defense Laboratory, San Francisco, received the Laboratory's second annual Gold Medal for Scientific Achievement on 6 May 1963. Dr. E. P. Cooper, Scientific Director of USNRDL presented the award.

By a series of ingenious experiments, Mr. Hunt demonstrated that small doses of ionizing radiation stimulate the mammalian nervous system directly. A very low dosage (3r) of ionizing radiation will awaken sleeping

rats within 12 seconds after exposure. Stimulation through radiosensitive mechanisms apart from visual receptor systems is indicated since ophthalmectomized animals exhibited both behavioral and heart rate response within seconds after the start of exposure. Tests of other experimental variables indicate that the state of neural excitability at the onset of radiation exposure may play an important role in determining the types of reactions which develop during the residual portion of exposure and the immediate postirradiation period.

Mr. Hunt—who has worked at USNRDL since 1951—will be nominated for the Navy Department's Bureau of Ships Award to be given this summer. A 1946 Bachelor of Arts graduate from Michigan State College, Mr. Hunt has submitted a thesis on this work for his Ph D at UCLA.

—Public Info Officer, 12th ND

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Orthopedic Pathology Course at AFIP

A course in Orthopedic Pathology will be given at the Armed Forces Institute of Pathology, 30 September through 8 November 1963. The course is designed to meet all the requirements in this field of the American Board of Orthopedic Surgery—a six-week period of lectures and laboratory instruction in the embryology, anatomy, and histology of bone, and the deviations from normal which constitute pathologic processes. The biochemistry and physiology of bone as related to these processes will be reviewed. The course will cover the field of disease of bones, joints, and muscles. There will be a substantial emphasis in unsolved problems; illustrated lectures on advanced theory of orthopedics and orthopedic diseases; and familiarization with current basic research in this field. Eligibility requirements: Regular Officers of the Armed Forces who are currently in Orthopedic Training.

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The Patient - Our Raison D'Etre

NOTE: LCDR A. R. Petoletti MSC USN, Staff Officer of the U. S. Naval Dispensary, Washington, D. C., has submitted the following statement concerning his concepts of patient care:

> "During my career which has included duty at a naval hospital, hospital corps school, and U. S. Naval Dispensary, certain principles of patient consideration have come to appear quite essential in the development and maintenance of a positive attitude toward good patient care. These principles have been composed into a document which I have called The Ten Commandments of Patient Consideration."

These key points in patient care are published for the consideration of anyone who might desire to reproduce them for local use. Our appreciation goes to LCDR Petoletti for this thoughtful contribution. —Editor

The Ten Commandments Of Patient Consideration

The Patient *is not in a normal condition — he is in a state requiring medical attention and personal understanding.*

The Patient *is not a routine concern — he is an individual case requiring individual evaluation and treatment.*

The Patient *is deserving of the most courteous and attentive treatment we can give him.*

The Patient *has devoted part of his life to our country or is dependent on someone who has.*

The Patient *is not an interruption to our work — he is the purpose of it.*

The Patient *is here because he needs to be — not necessarily because he wants to be.*

The Patient *is not a cold statistic — he is a flesh and blood human being with emotions and feelings like our own.*

The Patient *is not someone with whom we should argue or match wits.*

The Patient *is deserving of professional treatment by personnel who keep abreast of the latest knowledge and techniques of modern medical research.*

The Patient *is the most important person in our mission.*

FROM THE NOTE BOOK

CDR Bird Receives New Honors. CDR E. W. Bird MC USN, Head of Audio-Visual Training, BuMed, has been named to direct the Medical Section of the United States Exposition in Rio de Janeiro, having the theme "Allies in Progress" opening on 19 July 1963. The Medical Section will feature mass immunization technics, methods of both patient and professional education, and new electronic equipment for patient care. Under Public Health direction, immunizations will be provided free to the general public as part of the medical demonstrations.

Recently, CDR Bird was also honored by being elected Chairman of the Joint Armed Forces Section of the Department of Audio-Visual Instruction, National Education Association; he is the first physician to hold this position.

CAPT Timberlake Honored. At the Annual Convention of the American Pharmaceutical Association held at Miami Beach, Fla., May 12 - 17, CAPT Claude V. Timberlake MSC USN of the Bureau of Medicine and Surgery was elected Chairman of the Military Section of APhA.

American Board Certifications

American Board of Internal Medicine
LCDR Richard S. Crampton MC USNR

American Board of Obstetrics and Gynecology
LCDR John R. Kane MC USN

American Board of Orthopaedic Surgery
LCDR James W. Bickerstaff Jr, MC USN
LCDR Elmer L. Bingham MC USN

American Board of Pathology
LT Paul B. Radelat MC USNR
(Anatomic and Clinical Pathology)

American Board of Surgery
LCDR Perry Ah-Tye MC USN
LCDR William F. Brunner MC USN
LCDR Donald C. Colter MC USN
LCDR Peter A. Duhamel MC USNR
LCDR William P. Sadler MC USNR
LCDR John P. Sweeny MC USN

American Board of Urology
LCDR Carter E. Carlton Jr, MC USN
LCDR David E. Cowan MC USN

Surgeons General of the Past

(Fifteenth in a series of brief biographies)

Newton L. Bates, eleventh Surgeon General of the Navy and fifteenth Chief of the Bureau of Medicine and Surgery, was born in New York and appointed from that State as an assistant surgeon on 30 July 1861. He was first attached to the Naval Hospital, New York City, and then served on the USS SENECA in the South Atlantic Blockading Squadron. Later he went to the USS BENTON of the Mississippi Squadron. Thus, he saw much active service at sea during The War Between the States. From 1864 to 1867 he was attached to the U. S. Naval Laboratory and Department of Instruction from which was created the Naval Medical Supply Depot (1906).

The future Surgeon General had been promoted to the grade of Surgeon on 16 September 1865. After the War Between the States, he saw much sea duty, serving on the USS PORTSMOUTH, SWATARE, MIANTONOMAH, the PAWNEE, BROOKLYN (fleet surgeon), and MINNESOTA. Later, he commanded the Naval Hospital, Yokohama, Japan for two years and then was attending surgeon in Washington, D. C. for three years, 1884 - 1887.

On 1 October 1897, President McKinley appointed him Surgeon General. Doctor Bates was ill at the time and, in fact, was sworn in at his home, not being able to go to his office in the Navy Department. He died 18 days later on 18 October 1897.

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Naval Medical Research Reports

U. S. Naval Medical Field Research Laboratory, Marine Barracks, Camp Lejeune, N. C.

1. User Test of Sink Unit, Scrub, Field Hospital: MR 005. 12-6001. 6, Apr '63.
2. Evaluation of Disposable Paper, Hospital Garments, and Linen: MR 005. 12-6001. 6, April 1963.

Aviation Medical Acceleration Laboratory, U. S. Naval Air Development Center, Johnsville, Penna.

1. System for Programming Experiments and for Recording and Analyzing Data Automatically: MR 005. 13-0002. 16 Report No. 9, February 1963.
2. Effects of Acceleration on Pilot Performance: MR 005. 13-1004. 1 Report No. 8, March 1963.
3. Lever Displacement During a Discrimination-Differentiation: MR 005. 13-0002. 16 Report No. 10, April 1963.

U. S. Naval Medical Research Laboratory, U. S. Naval Submarine Base, New London, Conn.

1. Auditory Problems in the Navy: MR 005. 14-1001-2. 11, Report No. 398, December 1962.

(To be continued)

DENTAL SECTION

Cutaneous Sinuses of Dental Origin

H. L. Stoll, Jr., MD, 666 Elm St., Buffalo 3, New York. JAMA 184(2): 120-124, Apr 13, 1963.

The etiologic, diagnostic, and therapeutic aspects of cutaneous sinuses of dental origin are illustrated by analysis of 22 cases. Unfamiliarity with this entity frequently is responsible for failure to recognize the dental cause of the cutaneous sinus. The most common cause of the cutaneous lesion was a periapical abscess. Sixteen patients presented a nodule at the cutaneous orifice of the sinus, and 6 patients showed a scar from previous treatment. Intraoral radiographs confirmed the clinical diagnosis in all cases. Previous surgical, electrosurgical, or radiation therapy of the skin lesion in 15 patients was not curative and was often disfiguring. In the 18 patients treated by removal of the involved tooth or retained roots and by curettage of the alveolar abscess, 17 sinuses healed with no direct treatment of the cutaneous lesion.

The importance of recognition of the true nature of the cutaneous sinus of dental origin and its sources is emphasized. The cutaneous lesion is usually a nodule located in a depression below the level of the normal surrounding skin. The histology of the cutaneous lesion shows chronic inflammation. The cutaneous sinus arises most commonly, but not always, from a periapical abscess. The development of the cutaneous sinus from the dental source is determined by several related anatomic factors. Diagnosis depends upon specialized radiographs as well as clinical findings. Successful treatment requires removal of the underlying dental pathology.

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How Long Does Sugar Remain in the Mouth?

Gerald J. Cox, Frank J. Draus, and Cheryl P. Entress, School of Dentistry, University of Pittsburgh, Pittsburgh 13, Pa. Dental Progress 3(3): 152-154, April 1963.

It is usually difficult to impress upon young children the reasons behind toothbrushing, especially when it must follow immediately the obvious joys of eating. Even adults, who easily accept the notion of food particles lingering to nourish the bacteria of decay, often depend on such things as toothpicks, dental

floss, and chewing gum to solve the problem, not realizing that sugar in solution also contributes to caries.

Presumably the rate of cavity formation is proportional to the quantity of soluble carbohydrates available and the length of time it remains in the mouth, and preventive dentistry would be served by an easily understood, easily administered, demonstration of the oral clearance time of soluble glucose, as a representative of sugars, the worst offenders.

For educational purposes such a test has been devised which can be duplicated in any home, classroom, or dental office. It employs readily available materials, purposely selected so as not to cause apprehension in the subjects. No diagnostic implications are involved, and this test as presented here cannot attempt to evaluate the relative clearance times or cariogenicity of various foods. Practicing dentists sometimes complain that prevention is excessively time-consuming, is dull or unpleasant for the patient, and involves unfamiliar techniques. The Tes-Tape test for oral glucose meets all these objections.

Commercially available paper strips of Tes-Tape are sold in retail pharmacies without prescription. As a source of β-glucose, commercial corn syrup is mixed with tap water in a 1:5 dilution. The only other materials needed are a clock, small paper cups, and flat white-birch toothpicks.

The Standardization Group

Conditions for administration of the test were standardized by testing 89 male freshman dental students in groups of 8-24. Each was given a sheet of white paper to which was attached strips of Tes-Tape, 1/4" x 4", numbered in three's from 0 to 27 for recording at 3-minute intervals. The paper—and strips—were headed by the words "solution" and "saliva." Each man was also given a small paper cup into which he poured approximately 12 ml glucose syrup solution, which had been prepared in his presence. Each received a supply of toothpicks and was instructed not to touch the Tes-Tape with his fingers.

To begin with, each subject touched the saliva in his freshly rinsed mouth with a clean toothpick and placed a dot of this saliva on the Tes-Tape strip labeled "zero" under "saliva." Likewise he dipped a clean toothpick into his cup of glucose and placed a dot of this under "solution." This second dot quickly turned green.

The subject then swished the glucose solution in his mouth for 30 seconds, either swallowed or spat it out, and immediately took a sample of his saliva with a clean toothpick. This dot of saliva was placed on the Tes-Tape beside the other at the zero time mark. Thereafter, at intervals of 3 minutes, each sampled his saliva with a clean toothpick and placed the saliva dot beside the proper time indication. The naturally yellow test paper turned green under the dots of saliva until the glucose solution had been cleared from the mouth by salivation. It visibly indicated presence of glucose down to less than 0.1% concentration.

In the original a graph shows the distribution of clearance times as recorded for the 89 young men. They were run simultaneously with Benedict's

qualitative test; the clearance times were generally less with the latter, indicating that the Tes-Tape method is more sensitive for demonstrating glucose in saliva. An additional advantage is that the Tes-Tape method does not require a collection of saliva.

Validity of the Test

Among the members of any group taking part in any test, some are certain to ask: "What does it prove?"

The validity of the Tes-Tape test lies in its ability to indicate the presence of sugar—in this case glucose—in the saliva. Although many questions still surround the nature and control of dental caries, there is little question that caries is due to association with carbohydrate fermentation. Applying saliva to Tes-Tape at spaced intervals indicates how long after ingestion glucose remains in the mouth. Since glucose is known to facilitate bacterial growth, to ferment rapidly, producing an acid strong enough to decalcify enamel, it follows that at least part of the battle against caries is thorough brushing and rinsing the teeth after meals.

The plaintive query: "But why immediately after eating?" might be well answered by the observations of Fosdick that the sugar-produced acid may be present in sufficient concentration to decalcify enamel within 3 minutes after eating. In many cases the action may continue for 30-90 minutes before saliva washes the acid away. The carious process which destroys teeth is thus cumulative in the sense that it occurs in many short periods.

We have seen that the time required for the saliva to become clear of sugar varies from individual to individual. Obviously those with longer clearance times should exercise particularly rigid oral hygiene. Although we have characterized the test as non-diagnostic, at least one investigator has pointed out that caries-susceptible people retain sugar longer than most.

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Personnel and Professional Notes

Capt Faubion Takes Recruit Brigade Review on Preble Field. Capt Bernard H. Faubion, Director of the Dental Department, Naval Training Center, San Diego, California, received the salutes of the Recruit Brigade on 3 May 1963.

Continuing Education Course in Preventive Dentistry. During the week of 6-10 May 1963, the course "Preventive Dentistry," one of the Continuing Education Program Courses, was held at the U. S. Naval Dental School, NNMC, Bethesda, Md. This course focused attention on the cause, pathology, and incidence of dental disease as well as practical methods for prevention and control. The course was presented by personnel of the U. S. Naval Dental School, and a number of guest lecturers who are leading authorities in the associated subjects.

Naval Dental Officers Appear at Southern California State Dental Association Meeting. The following Dental Officers on duty at the U. S. Naval Training Center, San Diego, Calif., presented Table Clinics at the annual meeting of the Southern California State Dental Association which was held recently at the Ambassador Hotel in Los Angeles:

Lt George D. Pirie DC USN Lt Thomas G. Troxell DC USNR Lt James N. Matchefts DC USNR	General Dentistry with Special Cases at the U. S. Naval Training Center, San Diego
Lt Isaac K. Hawkins DC USNR Lt Lawrence D. Pitcher DC USNR	Mechanical Mixing of Silicate Cements

Capt Lyons Appears at Meetings. Capt N. E. Lyons DC USNR recently presented a clinic at Northwest Armed Forces Dental Society at Madigan General Hospital, Tacoma, Washington. His subject was "Simplified Technique for Class Five Gold Foil Restorations."

Capt Lyons also presented a table clinic at Washington State Dental Association Scientific Session Meeting at the Olympic Hotel, Seattle, Washington. His subject was "The Use of Gold Foil Restorations in Conjunction With the Construction of Cantilever Bridges."

Capt Lyons is the Senior Dental Officer at the USNAS, Seattle, Wash.

Dr. DeVan Guest Lecturer at Naval Dental School. Dr. Muller M. DeVan, Professor and Chairman of Prosthetic Dentistry, The Graduate School of Medicine, University of Pennsylvania, Philadelphia, Pennsylvania, recently lectured on "Procedures Prior to the Prosthodontic Prescription" to staff, resident, and postgraduate dental officers, and civilian and military guests, at the U. S. Naval Dental School, Bethesda, Maryland.

Dr. DeVan was formerly Supervisor of Postgraduate Courses in Partial and Complete Prosthetics, School of Dentistry, University of Pennsylvania. He is a Diplomate and Past President of the American Board of Prosthodontics, and Director of the American Equilibration Society.

Dental Service to the Marine Corps. Senior Navy Dental Officers recently held a three-day conference at Headquarters Marine Corps, Washington, D. C., to discuss the problems of providing dental service to the Marine Corps.

The Conference heard welcoming remarks by Lieutenant General Wallace M. Greene, Jr., Chief of Staff, Headquarters Marine Corps. Rear Admiral Curtis W. Schantz, DC, USN, Assistant Chief, Bureau of Medicine and Surgery and Chief of the Dental Division, delivered opening remarks. The conference, first of its type sponsored by the Marine Corps, was coordinated by Captain Victor J. Niiranen, Staff Dental Officer, Headquarters Marine Corps.

The agenda items for the conference, although broad in scope, were grouped under five general subjects; training, equipment, personnel, research and development, and Reserve matters.

Almost 50 years ago, on August 4, 1913, the first Navy dental officer was ordered to the Marine Corps for duty. He was acting assistant dental surgeon Lucian C. Williams, and his first duty station was Parris Island, S. C.

Since that time, thousands of Navy dental officers and dental technicians have served with Marine units in peace and war.

Conversion of Dental Operating Units to Higher Speed Operation. Information and instructions relative to procurement of air turbines required for additional conversions of dental operating units to higher speed operation is furnished in BUMED NOTICE 6750, dated 15 May 1963.

Change Bulletin No. 22 of the Federal Supply Catalog, Medical Materiel Section, FSC Class 6520, indicated the addition of FSN 6520-754-0279 HANDPIECE AND AIR TURBINE UNIT, DENTAL, as a standard item of supply. Procurement action for this item was not effected by the Defense Medical Supply Center, and the Defense Medical Materiel Board has recommended deletion of the item from the Federal Supply Catalog.

Other than BUMED Activities, all ships and stations that have a requirement for additional air turbine units to complete the conversion of in-use operating units to higher speed should submit open purchase requisitions to the Chief, Field Branch, Bureau of Medicine and Surgery, 3d Avenue and 29th Street, Brooklyn 32, New York, in accordance with BUMED Instruction 6700.16B (NOTAL). In addition to citing appropriate accounting data (local funds), each requisition should contain a detailed professional justification and, if procurement of a particular brand is required, a certification as follows: "Procurement from a sole source of supply is deemed necessary _____ (for whatever reasons considered appropriate) as a proprietary item." In addition, each requisition shall indicate the number of dental operating units in use, the number previously converted with air turbines, and a preference for type (latch or friction grip) handpiece desired. Information regarding manufacturers models and prices may be obtained by letter request to Chief, Field Branch, Bureau of Medicine and Surgery.

BUMED Management Activities shall comply with BUMED Instruction 4235.5 (NOTAL) and the BUSANDA Manual.

Dr. Naylor lectures at U. S. Naval Dental School. Surgeon LCdr (D) Malcolm N. Naylor, Senior Lecturer in Preventive Dentistry at Guy's Hospital, London, England, lectured on "Mechanism of Sensation in Dentin" to staff, resident, and postgraduate dental officers, and civilian and military guests, at the U. S. Naval Dental School, Bethesda, Md., on Thursday 16 May.

Dr. Naylor was trained as a maxillofacial surgeon and became a Fellow of the Royal College of Surgeons of England in 1958. He is Scientific Editor of the British Dental Journal.

Dr. Naylor is on a month's tour of the United States and he will be visiting research and teaching institutions throughout the country.

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AVIATION MEDICINE DIVISION

Acoustic Tests in the Mark IV Full Pressure Suit Helmet

By Robert T. Camp, Jr., with the Technical Assistance of James W. Greene and Scott N. Morrill, U. S. Naval School of Aviation Medicine, U. S. N. A. M. C., Pensacola, Fla., 1 Oct. 1962.

The Bureau of Naval Weapons requested that the acoustical level in the Mark IV full pressure suit helmet be measured when operated with each of two torsos. The noise sources in each of the two torsos, one the Arrowhead torso and the other B. F. Goodrich torso, were to be determined and necessary corrective action was to be recommended.

In preparation for the acoustical measurements to be made under a precarious situation such as that encountered in testing a full pressure suit under altitude conditions, it was necessary to determine the stability of the condenser microphones under such conditions and correction factors at the various simulated altitudes. In lieu of the electrodynamic transducer as a signal source, a piston phone was used to calibrate the microphone. A check of the recovery of equilibrium of the pressure across the diaphragm of the microphone was done under the various altitude conditions and correction factors were noted when deviation from sea level calibrations occurred.

During previous tests in the Mark IV full pressure suit it was learned that the primary sources of noise are the oxygen and ventilation air flows. It was therefore decided that the measurements would be done under all combinations of four off and on conditions of the two gas flows. The four gas input conditions were: (1) breathing with ventilation air; (2) holding breath with ventilation air; (3) breathing without ventilation air; and, (4) holding breath without ventilation air. The oxygen flow was stopped by holding the breath. Measurements of the noise under each of the four gas input conditions were made under each of seven simulated altitude conditions; namely, sea level, 10,000, 20,000, 30,000, 40,000, 50,000 and 60,000 feet.

Experienced listeners were chosen to occupy the torsos when the acoustical measurements were made to estimate the noise levels in the suit under each experimental condition. These estimates served as checks on the performance of the microphone during the tests. Large differences between estimated levels and measured levels would have been reason for repeating measurements checking for equipment failures under the rapidly changing ambient pressure conditions.

When each listener was dressed with a torso and helmet, a small condenser microphone (Altec 21BR-150) was placed inside the helmet near an earphone and secured. The cord from the microphone was fed out through the side of the torso. The output of the microphone, outside the suit, was wired to a line through the wall of the low pressure chamber to the other electronic equipment outside the chamber. The noise signals from the microphone were filtered by an SKL 302 Variable Electronic Filter which passed a wide band from 50 to 15,000 cps. This filtering eliminated the extremely low frequencies that one encounters in such measurements. The output of the filter was fed into a vacuum tube voltmeter, a Hewlett-Packard 400H, and a Bruel and Kjaer 2409 voltage amplifier. The output of the voltage amplifier was fed into an Ampex 600 magnetic tape recorder. This instrumentation made it possible to note the voltage output of the microphone, convert these voltage values into SPL, and record the noise spectrum on the tape recorder under each experimental condition.

Results and Discussion

Tables I and II show the results of the sound measurements made in the helmet with both torsos. Sound pressure level values measured in the helmet operated with the Goodrich torso are shown in Table I. Table II shows sound pressure levels measured in the helmet with the Arrowhead torso.

It may be seen that with the Goodrich torso the range of sound pressure levels was from 60 db through 88 db under all conditions. The Arrowhead torso yielded a range from 54 db through 84 db sound pressure levels. The Arrowhead yielded lower levels than the Goodrich. With respect to acoustic output for both torsos, a rank order of the four conditions from the lowest to the highest sound pressure level is: (1) no ventilation air flow while holding breath; (2) no ventilation air flow while breathing; (3) ventilation air flowing while holding breath; and, (4) ventilation air flowing while breathing.

The overall sound pressure levels with both torsos were stable while the occupant held his breath, but became very erratic for all altitude conditions below 40,000 feet. Breathing affected the overall level very little at 40,000 feet and at higher altitude conditions. For those conditions where breathing affected levels significantly, the lowest of the intermittent sound pressure levels under the breathing conditions were about the same as the constant sound pressure level with no breath. In other words, ventilation air flow seems to determine the minimum level under all conditions and breathing modulated that level to a higher intermittent level. In general, conditions with no breath increased sound pressure level with an increase of altitude. This holds true also for the minimum levels under the breathing conditions. The intermittent peak levels did not follow this trend. Altitude change affected these very little.

The sound attenuation characteristics of the full pressure suit helmet have been determined previously by this laboratory. (U. S. Naval School of Aviation Medicine Special Report 60-7 dated 12 September 1960.) It was found that a helmet and earphone cushions offer 13 db overall attenuation to ASA noise.

Table I

Sound Pressure Levels in Decibels Recorded in a Mark IV Full Pressure Suit Helmet With and Without Ventilation Air Flowing in a B. F. Goodrich Torso Under Conditions of Breathing and Not Breathing.

	With Ventilation		Without Ventilation	
Altitude	Breathing (db SPL)	Not Breathing (db SPL)	Breathing (db SPL)	Not Breathing (db SPL)
Sea Level	77 - 88	76	60 - 74	62
10,000 feet	77 - 80	76	60 - 74	60
20,000 "	80 - 82	81	60 - 70	60
30,000 "	86 - 87	88	63 - 66	60
40,000 "	85	85	73 - 76	73
50,000 "	86 - 87	87	74 - 76	74
60,000 "	83 - 85	84	74.8 - 76	74

Table II

Sound Pressure Levels in Decibels Recorded in a Mark IV Full Pressure Suit Helmet With and Without Ventilation Air Flowing in an Arrowhead Torso Under Conditions of Breathing and Not Breathing.

	With Ventilation		Without Ventilation	
Altitude	Breathing (db SPL)	Not Breathing (db SPL)	Breathing (db SPL)	Not Breathing (db SPL)
Sea Level	74 - 80	74	71 - 76	--
10,000 feet	71 - 76	74	62 - 71	--
20,000 "	76 - 77	76	57 - 68	57
30,000 "	81 - 83	82	54 - 63	54
40,000 "	83 - 84	82	62	62
50,000 "	83	83	60 - 62	60
60,000 "	79 - 80	79	62	62

It may be safely estimated that at least 6 db of this total attenuation is attributable to the earphone cushions. Therefore, the effective overall sound pressure levels at the ear of the occupant may be considered to be at least 6 db below the levels recorded in the suit. The effective sound pressure levels at the ears of the occupant are not of magnitudes to be significant from either a communication interference or hearing conservation viewpoint. Also, actual recorded levels may be considered insignificant in presence of noise levels normally encountered in a military jet aircraft cockpit under most operational conditions.

One other consideration in the evaluation of the acoustic conditions of the Mark IV full pressure suit is the amount of overall attenuation offered by the helmet and earphones. Whether or not more attenuation than the 13 db measured is desirable may be questionable. There is a possibility that more attenuation would rob the pilot of important auditory information on the operation of his engine. It may be necessary to determine what constitutes an optional degree of attenuation. These speculations are based upon estimated noise levels in single seated military aircraft. The writer does not have data on the cockpit noise of the latest Navy jet aircraft.

Conclusions

The data obtained from the acoustical measurements in the Mark IV full pressure suit helmet when operated with each of two torsos, the Arrowhead and the Goodrich, may be summarized as follows:

(1) Ventilation air flow increases noise level in the full pressure suit helmet at all altitudes between sea level and 60,000 feet.

(2) Breathing modulates noise levels in the suits, with or without ventilation air flowing, to intermittent higher levels at altitudes below 40,000 feet but has little effect at 40,000 feet and higher altitudes.

(3) The highest sound pressure level measured in the helmet when connected to the Goodrich torso was 88 db and the highest when connected to the Arrowhead torso was 84 db.

(4) The amount of overall attenuation to broadband noise offered by the full pressure suit helmet is 13 db.

(5) The noise levels that were measured in the helmet are not considered a hazard to hearing or a significant source of communication interference.

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Thousand Aviator Examination Program

From the U. S. Naval School of Aviation Medicine, U. S. N. A. M. C., Pensacola, Florida, 3 May 1963.

In 1940 a medical study, primarily cardiovascular, of 1,056 healthy Naval Cadets and instructors was initiated, at Pensacola; subsequent exams in 1951 and 1958 were conducted by physicians sent to the homes of the participants.

Previous data have aided in the selection of cadets for flight training, have shown the relative susceptibility of flying and non-flying personnel to certain diseases, and have revealed pertinent information on blood pressure, electrocardiography, and aging processes in general. The longer the project is continued, the more meaningful is the data; also the participants are now reaching the age at which cardiovascular diseases become manifest.

Currently the most extensive investigation of these men yet undertaken is being conducted under the direction of Captain Ashton Graybiel MC USN. The survey will be a joint Navy-Public Health Service project. Because of the more comprehensive testing an attempt is being made to bring as many of the group as possible to the Naval School of Aviation Medicine, Pensacola. Many of the tests utilized are basically research tools not found in the general hospital. Examinations will include, besides routine tests, special blood studies of lipoproteins; various exercise electrocardiograms; audiometry; psychologicals; special tests of space perception (Tilt Chair) and balance (Graybiel-Fregly Posture Test); Wedge spirometry, utilizing a velocity-volume loop; electroencephalography, tonometry and retinal photographs, vectorcardiograms, somatotyping, anthropometry, skin fold measurements, and ballistocardiography.

This project affords a unique opportunity to describe longitudinal changes in various physiologic parameters on an original healthy population, and to determine the influence of an aviation career on these physiologic attributes.

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Research Report: A Longitudinal Study of Blood Pressure *

Individual physiologic characteristics, environmental and genetic factors have been implicated in the alteration of blood pressure and in the pathogenesis of essential hypertension. It is recognized that these factors which influence blood pressure can be identified and evaluated only through a prospective study of an initially healthy population. Thus far there have been no longitudinal studies of blood pressure within a single group, and the major part of our knowledge has been derived from retrospective analysis or cross-sectional studies of presumably normal populations. These limited observations have led to conflicting interpretations concerning the nature of hypertension and the importance of various factors in its pathogenesis.

Pickering has challenged the classical concept that essential hypertension is a specific disease entity by presenting evidence that, in a general population, blood pressure represents a continuous variable with the hypertensive and nonhypertensive segments defined by an arbitrary division line. His thesis is that the hypertensive segment displays no discrete difference

*Bureau of Medicine and Surgery Project MR 005.13-3001, Subtask 2, Report No. 4, 31 Jan 1962.

from that of the remaining segment and that hypertension is attributable to a multifactorial genetic inheritance rather than to the influence of a single gene. In support of the classical concept are the findings of Platt and of Morrison and Morris demonstrating bimodality in frequency distribution curves of blood pressure. Starting with a general population whose blood pressures represented a continuous variable, they replotted the data after separating the people into two groups, one with parents who died prior to age 60 and the second alive through age 60. These curves and those based on plots of hypertensive probands and their siblings showed a bimodal distribution. This was taken as evidence in support of the thesis that the segment of the population with elevated blood pressure differs qualitatively from the normal segment and that this difference lies in the inheritance of a single gene which determines the disease, hypertension.

The available data are susceptible to different interpretations and McKusick has indicated the need for a prospective study which would allow evaluation of both environmental influences and hereditary factors. The present report describes the findings in a longitudinal study of a homogenous group of white males followed over an eighteen-year period. The results support the concept that hypertension is a quantitative difference in blood pressure resulting from a multiplicity of factors, both genetic and environmental.

Procedure

In 1940, a group of 1056 healthy white males were evaluated by a team of investigators sponsored by the Harvard Fatigue Laboratory. This group was composed of men previously selected for naval flight training, partially on the basis of meeting physical standards, and subsequent to this selection no subject has been eliminated from the group. The mean age in 1940 was 23.6 years ($\pm$3.6 years). Each subject entered the study at an optimal weight and with a supine blood pressure under 132/86 mm Hg. A number of physiological and psychological studies were performed in an attempt to delineate factors of importance in pilot selection. A monograph describes in detail the composition of the group, the studies performed, and the group performance. Surviving members of the original group were re-examined in 1951-52, and several reports have described various aspects of this examination. In 1957-58, these men were re-evaluated. Seven hundred and eighty-five men were examined during this period, and this represents over 96% of the surviving members. All deaths within the group have been verified and in most cases the exact cause documented with hospital records or post-mortem reports. Only three members of the original group could not be located. The data presented are derived from the serial examinations.

Blood pressure measurements in 1940 included a "casual" blood pressure recorded in the supine position and a "basal" blood pressure recorded in connection with a cold pressor test performed in the manner described by Hines and Brown. Measurements of height and weight, and an electrocardiogram were performed. Profile nude photography was accomplished with somatotyping of body characteristics under the direction of Dr. W. H. Sheldon.

Subsequent examinations have included a medical history with special emphasis on family history and personal habits and a complete physical examination with special attention directed to the cardiovascular system. The examinations in 1957-58 were performed by two of the authors (WRH and RKO) either in convenient government facilities or in the home of the subject. Laboratory evaluations in the present follow-up included 12-lead electrocardiograms with standard exercise test, chest x-ray, and measurement of serum cholesterol and lipoproteins.

The blood pressure measurements reported are "casual" blood pressures recorded in the supine position midway through the physical examination. Blood pressure was recorded with a standard 13 cm cloth cuff and mercury manometer. Systolic pressure was read with the appearance of sounds and diastolic at the point of disappearance of Korotkoff sounds. In 1940 and in 1958, the scale was read to the nearest even number. An effort was made to minimize "number bias." Only the first reading obtained in the supine position has been analyzed, but blood pressure was recorded in other positions and after a period of rest. Arm circumference was measured with a flexible tape in 200 subjects.

All data were coded and placed on IBM cards to facilitate analysis. The compiled data were used to construct a large matrix of Pearson correlation coefficients through use of an IBM 704 computor. This complete correlation matrix will be presented in a separate communication.

Findings

Frequency distribution curves of blood pressure yielded a unimodal distribution and indicated that blood pressure is a graded continuous variable. There was no evidence of natural bimodal distribution to suggest emergence of a qualitatively different population. Each individual tended to maintain his relative position within the distribution curve over the period of study, but this was modified by genetic and environmental factors.

Significant correlations were found between the variables of weight and somatotype. A significantly greater increase in blood pressure was noted in association with increasing weight. Subjects with a predominance of ectomorphic characteristics had a smaller increment of blood pressure over the period of study. Endomorphic subjects had a greater increment of blood pressure. The changes in blood pressure related to somatotype were modified by weight, but not dependent upon an increase in weight.

A family history of vascular disease was associated with a significantly greater increase in blood pressure. This increment was not dependent upon weight change, but was greater with an increase in weight. There was no evidence that a positive family history separated a portion of the population ranked according to blood pressure.

Analysis of the upper and lower segments of the distribution curves revealed significant differences between the characteristics of each group. These differences followed the same pattern as the entire group but were quantitatively different.

These results are discussed with regard to the concept that hypertension represents a quantitative difference in blood pressure resulting from a multiplicity of factors, both genetic and environmental.

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Short-Cuts to Oblivion

By Lt. Charles C. Cole, MSC, USN, Station Hospital, U. S. Marine Corps Air Station, Cherry Point, N. C.

An aviator represents one of the most highly specialized occupations of our society. The military aviator from initial screening to the termination of his career must unceasingly keep pace with all the technological advances. There is one aspect of pilot training that, in far too many instances, is placed low in priority. That field is Aviation Physiology Training and the old low pressure chamber and emergency escape procedures. OPNAV INSTR. 3740-3B places the responsibility directly on the Commanding Officer to ascertain that all pilots and crew members attend these training courses every 24 months. The Medical Department is responsible for the actual training. These Training Units are strategically located and staffed by competent Aviation Physiologists and supporting personnel. The curriculum is constantly being revised to make available to flying personnel the very latest advances in aviation medicine, oxygen equipment, ejection seat modifications, and the effects of extremes encountered in all types of potential emergencies in these fields. The complete training course varies but normally will take about two days. The course is culminated by an actual simulated flight in a low pressure chamber to the upper altitudes using standard equipment worn by the pilot. This last period is rather short and certainly should not be taken for qualification, nor should the shot in the ejection seat itself suffice for a 24 month period. Much valuable information is passed over if the classes are omitted.

Many reports are received by physiologists of pilots requesting only the low pressure chamber run or the shot in the seat. These pilots are asking for an extremely dangerous short-cut. This short-cut may be compared to a pilot who is to fly the F-3-H without his being sent to transition school. He already knows the basics of the trade, but he could not be expected to know the latest before training for it. All aviators are required to attend physiology training classes during pre-flight. As they progress so progresses medicine, oxygen equipment and escape procedures. Recently, two senior aviators gave credit to their recent training in greatly aiding their ejection from high performance aircraft.

No matter how proficient a pilot might be or how meticulous his ground crew is in keeping the aircraft in 4.0 condition, his failure to recognize one symptom of oxygen lack or unfamilarity with all phases of the effects of high altitude flight can nullify everything. Don't attempt to short-cut your aviation physiology training. Spend the time, it is well worth it. Important! — Spend it on the ground with friends — it's cold and lonely at 50,000 feet.

Alcohol and You

FLY, Naval Air Training Command, U. S. Naval Air Station, Pensacola, Florida, January 1963.

Widespread misconceptions have always existed about alcohol and its affect on the human body. Some men have thought themselves exempt or not as susceptible to the adverse reactions brought about by use of alcohol.

The use—and especially over-indulgence—of alcohol is of primary concern to the aviator. His life depends on his knowledge of body chemistry as it applies to alcohol.

In his book, Dr. Ross A. McFarland listed several facts about the effect of alcohol on the body: alcohol is absorbed rapidly without benefit of digestion, it appears in the bloodstream shortly after it is taken into the body, especially if the stomach is empty; it shows up in the tissues and organs in slightly more time than is required to trace the alcohol in the blood stream.

Concentration of alcohol and the rate of its absorption is affected by several factors:

1. The total amount of alcohol in a drink has a direct relationship to the concentration in the blood.
2. The dilution of a drink directly influences the rate of absorption.
3. The presence of food, especially such fatty substances as cream, milk, butter, or vegetable oils, retards the rate of absorption.
4. The variety of beverages has a marked influence; the alcohol of brewed beverages, such as beer, is absorbed more slowly than distilled liquor because the carbohydrates and other material in the beer act like food in slowing the process.
5. By drinking slowly and allowing time between drinks, an opportunity is given for the body to dispose of some of the alcohol before more is added, and the concentration of alcohol in the blood does not rise so high as with rapid drinking.

Alcohol is a depressant rather than a stimulant. It affects muscular skill, sensory acuity, memory and other measurable psychological functions.

Movements of the eye while reading or fixating on an object show significant variations in efficiency, averaging 21% of the normal values after 1-1/2 pints of beer or one to two ordinary cocktails. Alcohol has a pronounced effect on memory, judgment and reasoning. Although the magnitude of the effect varies from person to person, its direction is never reversed. The primary effect seems to be that attention and concentration are rendered less flexible for receiving new stimuli.

The ability of a pilot who is under the influence of alcohol to monitor a complex collection of instruments is directly lessened in proportion to the degree of alcohol influence. In today's high-speed, high-performance aircraft it is mandatory that the pilot possess all his faculties sharpened to their finest edge if he is to meet this challenge and live to once again drink AULD LANG SYNE.

Aviation Physiology

U. S. Navy Medical Service Corps

The Aviation Physiology Program of the Navy Medical Service Corps is administered by the Aviation Medicine Division of the Bureau of Medicine and Surgery. Its members share an important role in the Navy Medical Department's vast program of training naval aviators and aircrewmen to cope with the hazards of flight which may be encountered in the use of high performance naval aircraft. Unlimited opportunities exist for professionally qualified individuals who are interested in the various aspects of aerospace medicine.

Aviation physiologists are assigned to major naval aviation activities where duties consist of providing instruction in the physiological aspects of the high altitude environment, oxygen breathing equipment, cabin pressurization, personal airborne protective equipment, night vision techniques, use of the ejection seat, and fitting and operation of space suits. Physiological training devices, such as the low pressure chamber, the ejection seat trainer, and the night vision trainer, are operated under the supervision of the aviation physiologist. Officers whose duties require their exposure to simulated high altitudes in low pressure chambers may be paid special hazardous duty pay of an additional $110 per month.

Physiologists in training assignments who meet or acquire the educational requirements and demonstrate a capacity for research may move into the research program or develop a balanced career pattern of research and training. There are assignments combining in varying degrees research, test, and evaluation with training.

Aviation physiology is only one of a number of specialties in the Medical Allied Sciences Section of the Medical Service Corps and constitutes a relatively small segment of the total corps. While it is, of necessity, a very highly select group, there are a few vacancies available each year for qualified people to come on active duty and participate in the program. Applications are desired particularly from individuals who have received a Ph. D. degree or will receive the degree prior to actual appointment in the Navy. Such individuals are commissioned in the Naval Reserve as Lieutenants (Junior Grade) with eighteen months precedence in rank. Applications are also solicited from those who possess a master's degree with advanced academic training in physiology. Such individuals are commissioned in the Naval Reserve as Ensigns with a current date of rank. Aviation physiologists interested in a career in the Navy Medical Department may, under present regulations, apply for augmentation into the Regular Navy after a prescribed period of active duty in the Naval Reserve.

In addition to the opportunity to serve their country in their chosen profession, the Navy Medical Department also provides members of the Medical Service Corps certain financial assistance in the pursuit of further graduate education, work shops and seminars. Consultative and statistical assistance is available to those desiring to accomplish individual research endeavors

and officers are encouraged to participate in both regional and national professional meetings.

Application procedures are conducted through the Navy Recruiting Stations, and the one nearest your home can assist you in the initiation of an application for appointment and commission in the Medical Service Corps, U. S. Naval Reserve, as an aviation physiologist. If additional information is desired, please feel free to address inquiries to the Director, Medical Service Corps Division, Bureau of Medicine and Surgery, Department of the Navy, Washington 25, D. C.

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Spring Tips From Your Flight Surgeon

From "Weekly Summary of Aircraft Accidents," U. S. Naval Aviation Safety Center, Norfolk, Va., 14-20 May 1962.

Many of us have spent this past frigid winter sitting indoors cursing the weather. As a result, about the only exercise we got was flexing the elbows, beating our gums, and directing our wives shoveling snow. For this reason, that first nice sun-splattered warm spring day carries with it hidden dangers. Without further ado, our first instinct is to haul out the golf clubs, tennis racquet, lawn mower, or with whatever other instruments we celebrate nice weather—lo and behold, the dangers!

It only stands to reason that you don't rev up an aircraft, taxi onto the runway, and zoom off (well, at least not where somebody might be watching). Why? Because you want to warm up the engine and run a few checks. The same holds for your tennis or golf game. If you haven't played for months and proceed to play 3 or 4 sets of tennis or 18 holes of golf the first day, what happens? Sore muscles, charley horses, blisters, and most of all you miss playing for the next 7-10 days.

Well then, let us be wise by following a few timely suggestions:

1. Start slow, warm up your muscles and give them a chance to wake up from that long rest. Play one set of tennis or just hit a few iron shots that first day. Then go to something less strenuous like putting, or perhaps raking the lawn.

2. If you develop a blister on your hands or feet, don't puncture it. If you do, you ask for an infection. If it punctures inadvertently, keep it clean, leave the loose skin over the wound if possible and change the dressing frequently.

3. For minor sore muscles, try a warm soaking bath for about 20 minutes and take an aspirin before going to bed. This way your poor wife won't have to work as hard getting you out of bed in the A. M. after rigor mortis has set in.

4. By the way, you paunchy pilots who never look in the mirror sideways, remember, exercising alone doesn't trim that waist. Enough said!!!!

RESERVE SECTION

Control and Organization of the Naval Reserve

The mission of the Naval Reserve is to provide trained units and qualified individuals to be available for active duty in time of war or national emergency, and at such other times as the national security may require, to meet the requirements of the Naval Establishment in excess of the Regular component during and after the period needed for procurement and training of additional trained units and qualified individuals to achieve the planned mobilization.

The Naval Reserve as a component of the Navy shall be organized, administered, trained, and supplied under the direction of the Chief of Naval Operations. The offices and bureaus of the Navy shall hold the same relation and responsibility to the Naval Reserve as they do the Regular Navy.

The Chief of Naval Personnel is charged with the recruitment, instruction, personnel accounting, training (less aviation, medical, and dental), discipline, and distribution of personnel of the Naval Reserve and with their organization, administration, and mobilization. Accordingly, the principal duties of the Chief of Naval Personnel relative to the Naval Reserve may be enumerated as follows:

Within the restrictions imposed by the Basic Naval Establishment Plan, determines the number of personnel in the Ready, Standby, and Retired Reserve and establishes ceilings and allowances for the various types of training within the Reserve Program.

Prescribes the details of training (less aviation, medical and dental), for units and individuals, and the procedures to be followed. To this end, issues, reviews and revises curricula and training procedures as necessary to insure adequacy to meet training requirements.

Supervises appointments, enlistments, reenlistments, promotion, advancements, discharges, and retirements.

Provides for transfer between the various categories.

Supervises ordering reservists to and from active duty and active duty for training.

Maintains service records of reservists.

Maintains statistics and records of the drilling and training activities of the various programs.

Supervises the procurement of training centers and equipment for shore instruction (except aviation).

Determines the amount of money required from year to year for the Naval Reserve, presents appropriate budgets, and is responsible for such expenditures.

Publishes from time to time the policies and procedures to be followed in the training and administration of reservists.

Issues instructions for personnel accounting.

The Naval Reserve Training Command is a field command composed of the Headquarters, Naval Reserve Training Command, all Naval Reserve training activities (other than air), and Naval Reserve training ships. All Naval Reserve training ships are under the command of Commander, Naval Reserve Training Command. In addition, the following are under his military command:

All Naval Reserve Training Activities (other than Air).

Commandants of Naval Districts, for control of Naval Reserve matters.

The Commander, Naval Reserve Training Command is under the military command of the Chief of Naval Operations. The Headquarters, Naval Reserve Training Command, functions under the management control of the Chief of Naval Personnel.

The Commander, Naval Reserve Training Command exercises through the appropriate Naval District Commandant, military command of all Naval Reserve Training activities, other than air (OTA), and command of Naval Reserve Training ships assigned to or under the operational control of the District Commandants.

Under the Chief of Naval Operations he:

Evaluates, by inspections and other means, the state of readiness of the Selected Reserve (other than Air).

Reports annually, and at such other times as appropriate, to the Chief of Naval Operations, copy to the Chief of Naval Personnel, on the state of training and readiness of the Naval Reserve (other than Air) and on other Naval Reserve matters.

Directs the employment of all Naval Reserve training ships assigned to or under the operational control of the Naval District Commandants.

Recommends to the Chief of Naval Operations the assignment of Naval Reserve training ships to District Commandants and overhaul schedules for Naval Reserve training ships assigned to the District Commandants.

Maintains liaison with appropriate Fleet Commands in connection with the administration of Group L Naval Reserve Training ships, active duty for training in Fleet ships, and the mobilization assignment of all Naval Reserve training ships.

Maintains liaison as necessary with the bureaus and offices of Navy Department in connection with the discharge of their responsibilities to the Naval Reserve (other than Air).

Maintains liaison with the Chief, Naval Air Reserve Training, on matters of common interest.

Under the Chief of Naval Personnel he:

Directs and supervises the training and administration of the Selected Reserve (other than Air), other drilling Reservists in the Specialist and Composite Programs and Naval Reserve Officers' Schools, and other Reservists when appropriate, in accordance with prescribed standards and curricula.

Directs and provides guidance, as necessary, for recruiting in the Naval Reserve (other than Air).

Evaluates, by inspections and other means, the effectiveness of the training and administration of the Selected Reserve (other than Air), the Naval Reserve Officers' Schools and the Specialist and Composite Programs, including the effectiveness of Naval Reserve training equipment.

Directs corrective action in training and administration, and recommends changes in the organization, procedures and support of the Naval Reserve training program (other than Air), as appropriate, to maintain the Naval Reserve (other than Air) at a high state of readiness to perform its mobilization mission.

Prescribes policies and procedures governing the conduct of active duty for training afloat in Naval Reserve training ships, and establishes policies and coordinates the assignment to active duty for training in Naval Reserve training ships and fleet ships.

Prescribes and administers the Naval Reserve Competition (other than Air), and administers the award of the National Trophies.

(to be continued)

Bureau of Personnel Manual
Part H

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